

TECHNICAL INFORMATION

Product specifications Piezoelectric Ceramics

Piezoelectric Ceramics

Contents

Contents

- 1 DISCS
 - 1.1 Discs with nickel electrodes
 - 1.2 Discs with silver electrodes
 - 1.3 Discs with wrap-around silver electrodes
 - 1.4 Discs with round wrap-around silver electrodes
 - 1.5 Discs with round wrap-around nickel + gold flash electrodes
 - 1.6 Discs with circular wrap-around silver electrodes
- 2 PLATES
 - 2.1 Square and rectangular plates
 - 2.2 Plates with wrap-around electrodes
- 3 RINGS
- 4 SERIES BIMORPH ELEMENTS
- 5 PARALLEL BIMORPH ELEMENTS

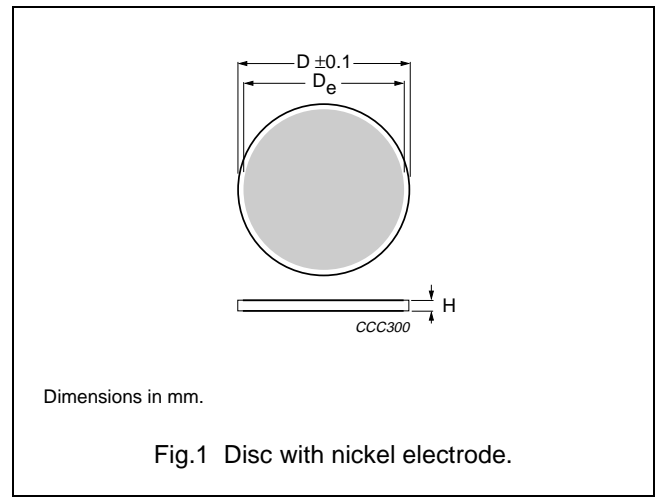
Piezoelectric Ceramics

Discs

1 DISCS

1.1 Discs with nickel electrodes

Our standard range of discs with nickel electrodes is available in grade PXE 5. Other grades and sizes are available on request. The positive pole is marked.



Disc data, nickel electrode; see Fig.1

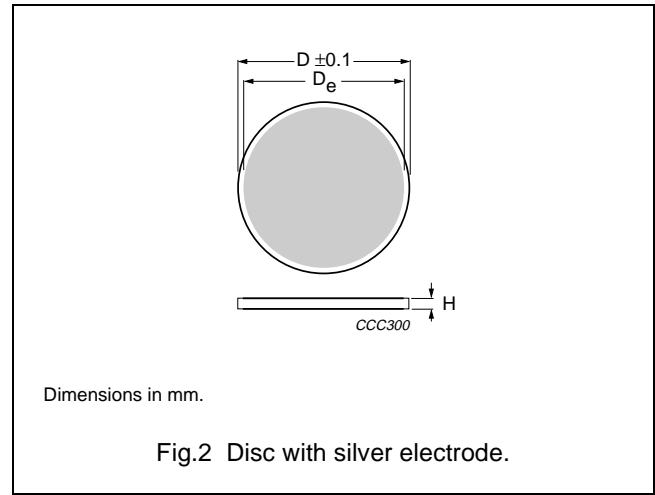
GRADE	D (mm)	D _e (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	5	5.0 ± 0.1	0.3 ± 0.03	1220 ± 25%	DSC5/0.3-PX5-N
	5	5.0 ± 0.1	0.5 ± 0.03	750 ± 25%	DSC5/0.5-PX5-N
	5	5.0 ± 0.1	1.0 ± 0.03	375 ± 25%	DSC5/1-PX5-N
	5	5.0 ± 0.1	2.0 ± 0.1	185 ± 25%	DSC5/2-PX5-N
	10	9.0 ± 0.3	0.2 ± 0.03	5900 ± 25%	DSC10/0.2-PX5-N
	10	9.0 ± 0.3	0.5 ± 0.03	2360 ± 25%	DSC10/0.5-PX5-N
	10	9.5 ± 0.3	1.0 ± 0.03	1390 ± 25%	DSC10/1-PX5-N
	10	9.5 ± 0.3	2.0 ± 0.1	700 ± 25%	DSC10/2-PX5-N
	10	9.5 ± 0.3	3.0 ± 0.1	460 ± 25%	DSC10/3-PX5-N
	10	9.5 ± 0.3	5.0 ± 0.1	280 ± 25%	DSC10/5-PX5-N
	16	15.0 ± 0.3	0.2 ± 0.03	17000 ± 25%	DSC16/0.2-PX5-N
	16	15.5 ± 0.3	0.5 ± 0.03	6800 ± 25%	DSC16/0.5-PX5-N
	16	15.5 ± 0.3	1.0 ± 0.03	3620 ± 25%	DSC16/1-PX5-N
	16	15.5 ± 0.3	2.0 ± 0.1	1800 ± 25%	DSC16/2-PX5-N
	16	15.5 ± 0.3	3.0 ± 0.1	1200 ± 25%	DSC16/3-PX5-N
	20	19.0 ± 0.3	0.2 ± 0.03	27000 ± 25%	DSC20/0.2-PX5-N
	20	19.5 ± 0.3	0.5 ± 0.03	10800 ± 25%	DSC20/0.5-PX5-N
	20	19.5 ± 0.3	1.0 ± 0.03	5700 ± 25%	DSC20/1-PX5-N
	20	19.5 ± 0.3	2.0 ± 0.1	2850 ± 25%	DSC20/2-PX5-N
	25	24.0 ± 0.3	0.2 ± 0.03	42925 ± 25%	DSC25/0.2-PX5-N
	25	24.5 ± 0.3	0.5 ± 0.03	17200 ± 25%	DSC25/0.5-PX5-N
	25	24.5 ± 0.3	1.0 ± 0.03	9000 ± 25%	DSC25/1-PX5-N
	25	24.5 ± 0.3	2.0 ± 0.1	4500 ± 25%	DSC25/2-PX5-N

Piezoelectric Ceramics

Discs

1.2 Discs with silver electrodes

Our standard range of discs with silver electrodes is available in grade PXE 5, PXE 41 and PXE 42. Other grades and sizes are available on request. The positive pole is marked.



Disc data, silver electrode; see Fig.2

GRADE	D (mm)	D _e (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	10	9 ± 0.3	0.5 ± 0.03	2360 ± 25%	DSC10/0.5-PX5-S
	10	=D	1.0 ± 0.03	1460 ± 25%	DSC10/1.0-PX5-S
	10	=D	2.0 ± 0.1	730 ± 25%	DSC10/2-PX5-S
	10	=D	3.0 ± 0.1	490 ± 25%	DSC10/3-PX5-S
	10	=D	5.0 ± 0.1	290 ± 25%	DSC10/5-PX5-S
	16	15 ± 0.3	0.5 ± 0.03	6800 ± 25%	DSC16/0.5-PX5-S
	16	=D	1.0 ± 0.03	3735 ± 25%	DSC16/1-PX5-S
	25	24 ± 0.3	0.5 ± 0.03	17200 ± 25%	DSC25/0.5-PX5-S
	25	=D	1.0 ± 0.03	9125 ± 25%	DSC25/1-PX5-S
PXE 41	25.4 ± 0.5	=D	2.0 ± 0.1	4560 ± 25%	DSC25/2-PX5-S
	31.75 ± 0.5	–	≈ 14.3; note 1	650 ± 25%	DSC32/14-PX41-S-T
PXE 42	25.4 ± 0.5	–	≈ 10.2; note 2	550 ± 25%	DSC25/10-PX41-S-T
	25.0 ± 0.1	–	1 ± 0.1	5750 ± 25%	DSC25/1-PX42-S
	25.0 ± 0.1	–	2 ± 0.1	2870 ± 25%	DSC25/2-PX42-S
	38.0 ± 0.5	–	3 ± 0.1	4430 ± 25%	DSC38/3-PX42-S
	38.0 ± 0.5	–	6 ± 0.1	2215 ± 25%	DSC38/3-PX42-S
	50.0 ± 1.0	–	3 ± 0.1	7670 ± 25%	DSC50/3-PX42-S
	50.0 ± 1.0	–	6 ± 0.1	3835 ± 25%	DSC50/6-PX42-S

Notes

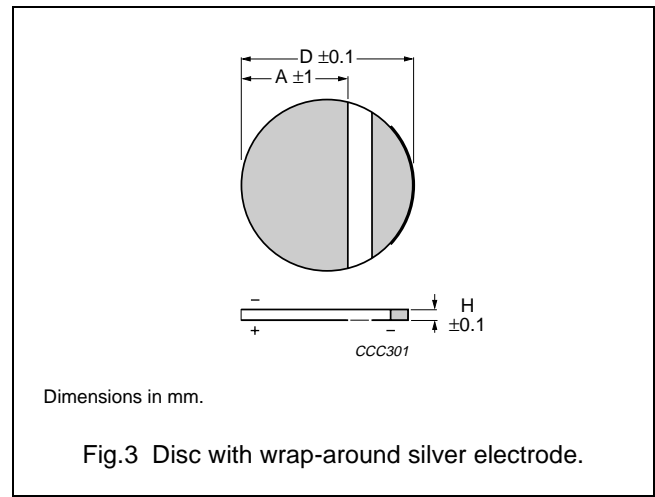
1. Tuned for 151 kHz.
2. Tuned for 200 kHz.

Piezoelectric Ceramics

Discs

1.3 Discs with wrap-around silver electrodes

These discs have provision for connecting both electrodes from one side by means of a wrap-around electrode as shown. They are therefore particularly suitable for bonding to flat substrates where electrical connection to both sides is difficult. The material is PXE 5, but other grades and sizes are available on request.



Disc data, wrap-around silver electrode; see Fig.3

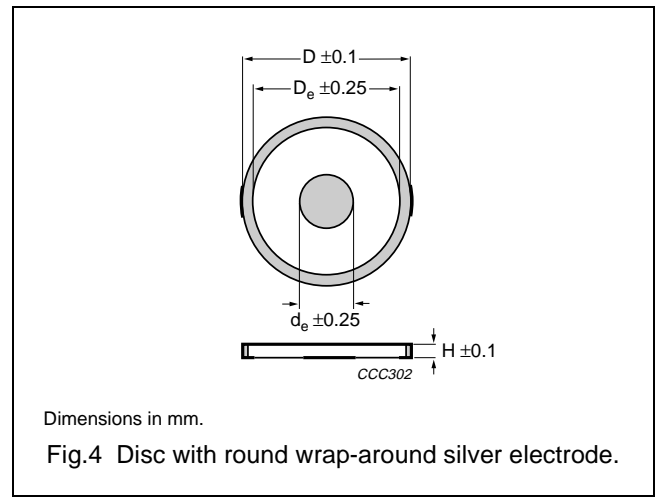
GRADE	D (mm)	A (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	10	6.5	1	1000 ±25%	DSC10/1/WL-PX5-S
	16	10.0	1	2600 ±25%	DSC16/1/WL-PX5-S

Piezoelectric Ceramics

Discs

1.4 Discs with round wrap-around silver electrodes

These discs have provision for connecting both electrodes from one side by means of a wrap-around electrode as shown. They are therefore particularly suitable for bonding to flat substrates where electrical connections to both sides is difficult. The material is PXE 42, but other grades and sizes are available on request



Disc data, round wrap-around silver electrode; see Fig.4

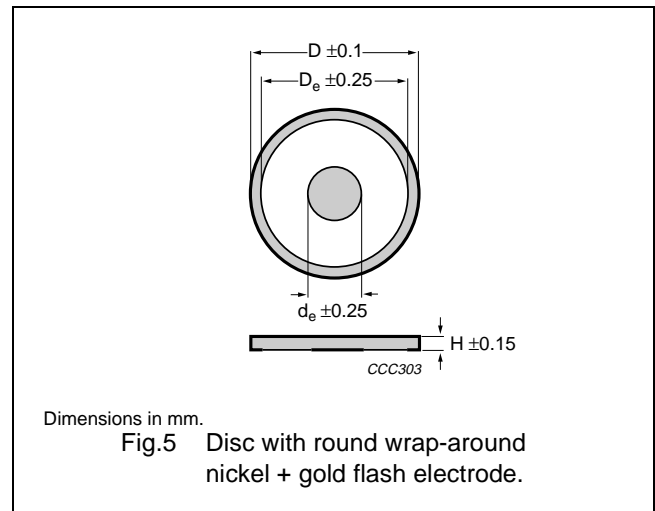
GRADE	D (mm)	D _e (mm)	d _e (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 42	20	17	7	0.85	730 ±20%	DSC20/7/0.9/WR-PX42-S
	20	17	7	1.2	520 ±20%	DSC20/7/1.2/WR-PX42-S
	20	17	11	0.85	1310 ±20%	DSC20/11/0.9/WR-PX42-S

Piezoelectric Ceramics

Discs

1.5 Discs with round wrap-around nickel + gold flash electrodes

These discs have provision for connecting both electrodes from one side by means of a wrap around electrode as shown. They are therefore particularly suitable for bonding to flat substrates where electrical connections to both sides is difficult. The material is PXE 5, but other grades and sizes are available on request



Disc data, round wrap-around nickel + gold flash electrode; see Fig.5

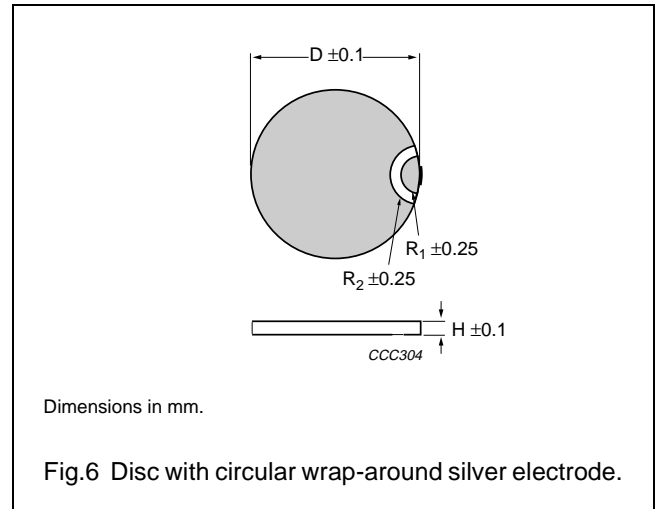
GRADE	D (mm)	D _e (mm)	d _e (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	16.0	14	7	2	490 ±20%	DSC16/2/WR-PX5-NG
	25.4	23	8	2	640 ±20%	DSC25.4/2/WR-PX5-NG

Piezoelectric Ceramics

Discs

1.6 Discs with circular wrap-around silver electrodes

These discs have provision for connecting both electrodes from one side by means of a wrap around electrode as shown. They are therefore particularly suitable for bonding to flat substrates where electrical connections to both sides is difficult. The material is PXE 5, but other grades and sizes are available on request.



Disc data, circular wrap-around silver electrode; see Fig.6

GRADE	D (mm)	R ₁ (mm)	R ₂ (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	16	2.5	3.5	1	3350 ±25%	DSC16/1/WC-PX5-S
	20	3	4	1	5230 ±25%	DSC20/1/WC-PX5-S
	25	3	4	1	8200 ±25%	DSC25/1/WC-PX5-S

Piezoelectric Ceramics

Plates

2 PLATES

2.1 Square and rectangular plates

The material grade in the following two tables is PXE 5, but other grades and sizes are available on request (any thickness between 0.2 and 3.0 mm is possible). The positive pole is marked.

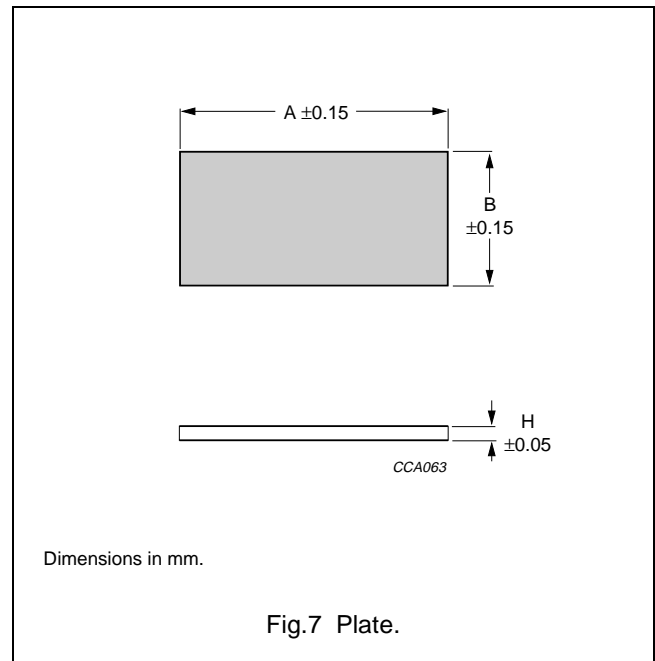


Plate data, nickel electrode; see Fig.7

GRADE	A (mm)	B (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	4	4	0.3	990 ±20%	PLT4/4/0.3-PX5-N
	8	4	0.3	1980 ±20%	PLT8/4/0.3-PX5-N
	12	4	0.3	2970 ±20%	PLT12/4/0.3-PX5-N
	6	6	0.3	2230 ±20%	PLT6/6/0.3-PX5-N
	12	6	0.3	4460 ±20%	PLT12/6/0.3-PX5-N
	8	8	0.3	3960 ±20%	PLT8/8/0.3-PX5-N
	10	10	0.3	6200 ±20%	PLT10/10/0.3-PX5-N
	12	12	0.3	8920 ±20%	PLT12/12/0.3-PX5-N
	12	6	0.5	2670 ±20%	PLT12/6/0.5-PX5-N
	12	6	1.0	1340 ±20%	PLT12/6/1.0-PX5-N

Plate data, silver electrode; see Fig.7

GRADE	A (mm)	B (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	16	12	1	3500 ±20%	PLT16/12/1-PX5-S
	12	6	0.5	2670 ±20%	PLT12/6/0.5-PX5-S
	12	6	1	1340 ±20%	PLT12/6/1-PX5-S
	12	6	1.25	1070 ±20%	PLT12/6/1.3-PX5-S

Piezoelectric Ceramics

Plates

2.2 Plates with wrap-around electrodes

These plates have provision for connecting both electrodes from one side by means of a wrap-around electrode as shown. They are therefore particularly suitable for bonding to flat substrates where electrical connection to both sides is difficult. The material is PXE 5, but other grades and sizes are available on request.

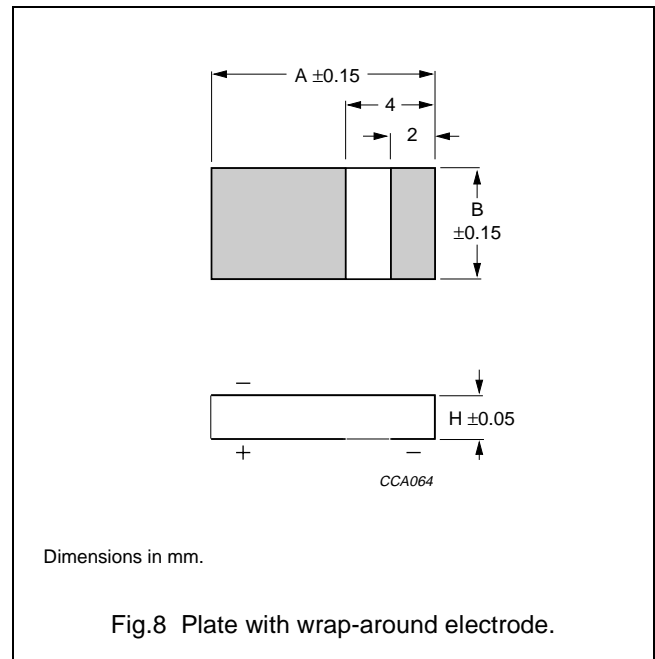


Plate data, silver electrode; see Fig.8

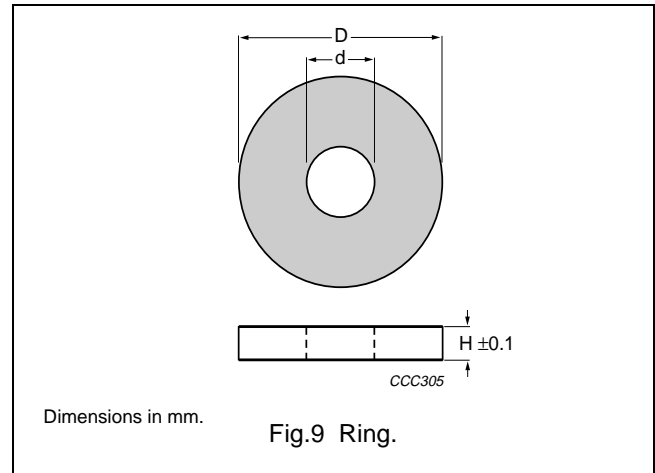
GRADE	A (mm)	B (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	10	4	1	480 ±25%	PLT10/4/1/W-PX5-S
	10	4	2	240 ±25%	PLT10/4/2/W-PX5-S
	10	5	1	600 ±25%	PLT10/5/1/W-PX5-S
	10	5	2	300 ±25%	PLT10/5/2/W-PX5-S
	15	5	2	550 ±25%	PLT15/5/2/W-PX5-S

Piezoelectric Ceramics

Rings

3 RINGS

Our standard range of rings has silver electrodes.
The polarization is axial and the positive electrode is marked. Other sizes and grades are available on request.



Ring data, silver electrode; see Fig.9

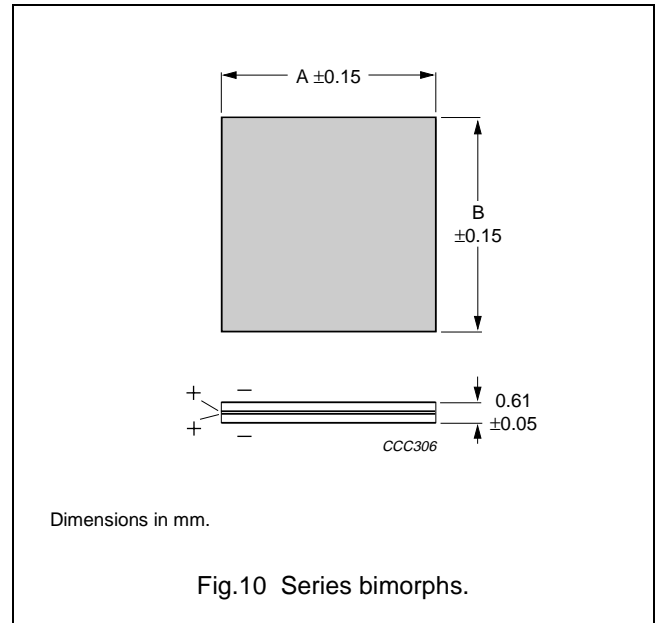
GRADE	D (mm)	d (mm)	H (mm)	CAPACITANCE (pF)	TYPE NUMBER
PXE 5	10 ±0.1	5.0 ±0.15	2	550 ±25%	RNG10/5/2-PX5-S
PXE 59	12 ±0.1	6.0 ±0.15	1	1200 ±25%	RNG12/6/1-PX59-S
	12 ±0.1	6.0 ±0.15	1.5	865 ±25%	RNG12/6/1.5-PX59-S
PXE 42	10 ±0.1	5.0 ±0.15	2	340 ±25%	RNG10/5/2-PX42-S
	15 ±0.1	6.0 ±0.15	3	580 ±25%	RNG15/6/3-PX42-S
	20 ±0.4	6.0 ±0.15	5	670 ±25%	RNG20/6/5-PX42-S
	25 ±0.5	10.0 ±0.2	4	1200 ±25%	RNG25/10/4-PX42-S
	25 ±0.5	10.0 ±0.2	5	965 ±25%	RNG25/10/5-PX42-S
	25 ±0.5	10.0 ±0.2	6	800 ±25%	RNG25/10/6-PX42-S
	38 ±0.6	12.7 ±0.3	4	2950 ±25%	RNG38/13/4-PX42-S
	38 ±0.6	12.7 ±0.3	6	1970 ±25%	RNG38/13/6-PX42-S
	38 ±0.6	12.7 ±0.3	6.35	1870 ±25%	RNG38/13/6-PX42-S
	38 ±0.6	19.0 ±0.4	4	2490 ±25%	RNG38/19/4-PX42-S
	38 ±0.6	19.0 ±0.4	6.35	1570 ±25%	RNG38/19/6-PX42-S
	50 ±1.0	20.0 ±0.4	5	3865 ±25%	RNG50/20/5-PX42-S
	50 ±1.0	20.0 ±0.4	6	3220 ±25%	RNG50/20/6-PX42-S
	50 ±1.0	20.0 ±0.4	6.35	3040 ±25%	RNG50/20/6.4-PX42-S
PXE 43	10 ±0.1	5.0 ±0.15	2	260 ±25%	RNG10/5/2-PX53-S
	20 ±0.4	6.0 ±0.15	5	500 ±25%	RNG20/6/5-PX43-S
	25 ±0.5	10.0 ±0.2	4	910 ±25%	RNG25/10/4-PX43-S
	25 ±0.5	10.0 ±0.2	5	730 ±25%	RNG25/10/5-PX43-S
	25 ±0.5	10.0 ±0.2	6	610 ±25%	RNG25/10/6-PX43-S
	38 ±0.6	12.7 ±0.3	4	2220 ±25%	RNG38/13/4-PX43-S
	38 ±0.6	12.7 ±0.3	6	1480 ±25%	RNG38/13/6-PX43-S
	38 ±0.6	12.7 ±0.3	6.35	1400 ±25%	RNG38/13/6.4-PX43-S
	50 ±1.0	20.0 ±0.5	5	2910 ±25%	RNG50/20/5-PX43-S
	50 ±1.0	20.0 ±0.5	6	2425 ±25%	RNG50/20/6-PX43-S

Piezoelectric Ceramics

Series bimorphs

4 SERIES BIMORPH ELEMENTS

A range of square and rectangular bimorphs in grade PXE 5 for use in record players, accelerometers, detection systems in machinery, medical equipment and air transducers. The electrodes are nickel-plated. Series bimorphs are not recommended for use as actuators.



Bimorph data, nickel electrode; see Fig.10

A (mm) (note 1)	B (mm) (note 1)	CAPACITANCE (pF)	TYPE NUMBER
4.0	4.0	420 $\pm 20\%$	BIMS4/4/0.6-PX5-N
6.0	4.0	630 $\pm 20\%$	BIMS6/4/0.6-PX5-N
8.0	4.0	840 $\pm 20\%$	BIMS8/4/0.6-PX5-N
10.0	4.0	1050 $\pm 20\%$	BIMS10/4/0.6-PX5-N
12.0	4.0	1250 $\pm 20\%$	BIMS12/4/0.6-PX5-N
6.0	6.0	950 $\pm 20\%$	BIMS6s/6/0.6-PX5-N
8.0	6.0	1250 $\pm 20\%$	BIMS8/6/0.6-PX5-N
10.0	6.0	1600 $\pm 20\%$	BIMS10/6/0.6-PX5-N
12.0	6.0	1900 $\pm 20\%$	BIMS12/6/0.6-PX5-N
8.0	8.0	1700 $\pm 20\%$	BIMS8/8/0.6-PX5-N
10.0	8.0	2100 $\pm 20\%$	BIMS10/8/0.6-PX5-N
12.0	8.0	2550 $\pm 20\%$	BIMS12/8/0.6-PX5-N
10.0	10.0	2650 $\pm 20\%$	BIMS10/10/0.6-PX5-N
12.0	10.0	3150 $\pm 20\%$	BIMS12/10/0.6-PX5-N
12.0	12.0	3800 $\pm 20\%$	BIMS12/12/0.6-PX5-N
12.7	1.6	535 $\pm 20\%$	BIMS13/1.6/0.6-PX5-N
15.5	1.6	650 $\pm 20\%$	BIMS16/1.6/0.6-PX5-N
70.0	1.6	3000 $\pm 20\%$	BIMS70/1.6/0.6-PX5-N

Note

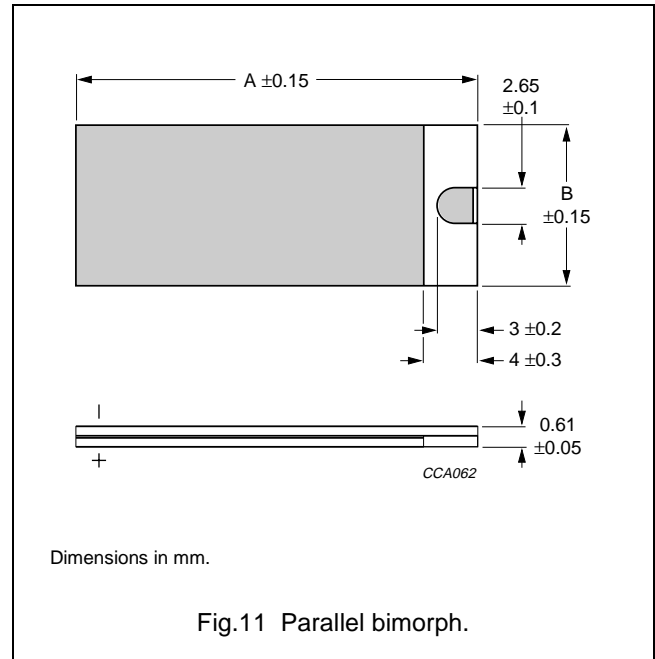
1. Other sizes are available on request.

Piezoelectric Ceramics

Parallel bimorphs

5 PARALLEL BIMORPH ELEMENTS

A range of rectangular parallel bimorph elements in grade PXE 5. The electrodes are nickel-plated and the inner electrode is accessible through a small cut-out in the upper plate. Parallel bimorphs are especially recommended for use as actuators.



Bimorph data, nickel electrode; see Fig.11

A (mm) (note 1)	B (mm) (note 1)	CAPACITANCE (pF) (note 2)	F _r MIN. (Hz)	DEFLECTION (μm) (notes 3 and 4)	TYPE NUMBER
15	6	9000	2200	95 ±20%	BIMP15/6/0.6-PX5-N
20	6	13000	1000	225 ±20%	BIMP20/6/0.6-PX5-N
25	6	16500	500	400 ±20%	BIMP25/6/0.6-PX5-N
30	6	20000	350	640 ±20%	BIMP30/6/0.6-PX5-N
35	6	24000	240	935 ±20%	BIMP35/6/0.6-PX5-N
15	12	18000	2200	95 ±20%	BIMP15/12/0.6-PX5-N
20	12	25000	1000	225 ±20%	BIMP20/12/0.6-PX5-N
25	12	33000	500	400 ±20%	BIMP25/12/0.6-PX5-N
30	12	40000	350	640 ±20%	BIMP30/12/0.6-PX5-N
35	12	48 000	240	935 ±20%	BIMP35/12/0.6-PX5-N

Notes

- Other sizes are available on request.
- The capacitance between the central electrode and the interconnected outer electrodes.
- Deflection peak-to-peak at 300 V peak-to-peak (±150 V) with free length is A – 5 mm.
- Bimorph not mechanically loaded.

Piezoelectric Ceramics

Product specifications

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.